P-2.9 Explain how torque is affected by the magnitude, direction, and point of application of force

Revised Taxonomy Level 2.7 B Explain conceptual knowledge
Key concepts
Torque
Center of gravity
Torque arm

Students did not explore rotational motion in physical science

As Physics for the Technology classes and traditional college prep classes will have different curricula based on the choices that are made for standards six through ten, the scope of the core curriculum should vary as well. The emphasis of topics within the core standards will depend on subsequent topics to be addressed.

It is essential for students to

- Understand that translational equilibrium occurs when all of the forces are balanced, meaning the object will not accelerate.
- Understand that torque (moment of inertia) is influenced by force, direction, and point of application.
- Understand that unbalanced torque produces rotation
- Understand that torque is
  - force applied with leverage,
  - torque is force applied over a distance
  - torque = force x lever arm ($\tau = fd$)
- Understand that rotational equilibrium occurs when torques are balanced, meaning the object will not rotate
- Understand the concept of center of gravity
- Solve problems involving the concept of torque
- Understand the difference in rotation and revolving

Assessment

As the verb for this indicator is explain the major focus of assessment will be for students to "construct a cause and effect model". In this case, assessments will ensure that students can model how the application of torque (in terms of force, direction, and length of torque arm) affects the motion of an object.

Because the indicator is written as conceptual knowledge, assessments should require that students understand the "interrelationships among the basic elements within a larger structure that enable them to function together." In this case, assessments must show that students can construct a cause and effect statement relating how various applied torques affect the motion of an object